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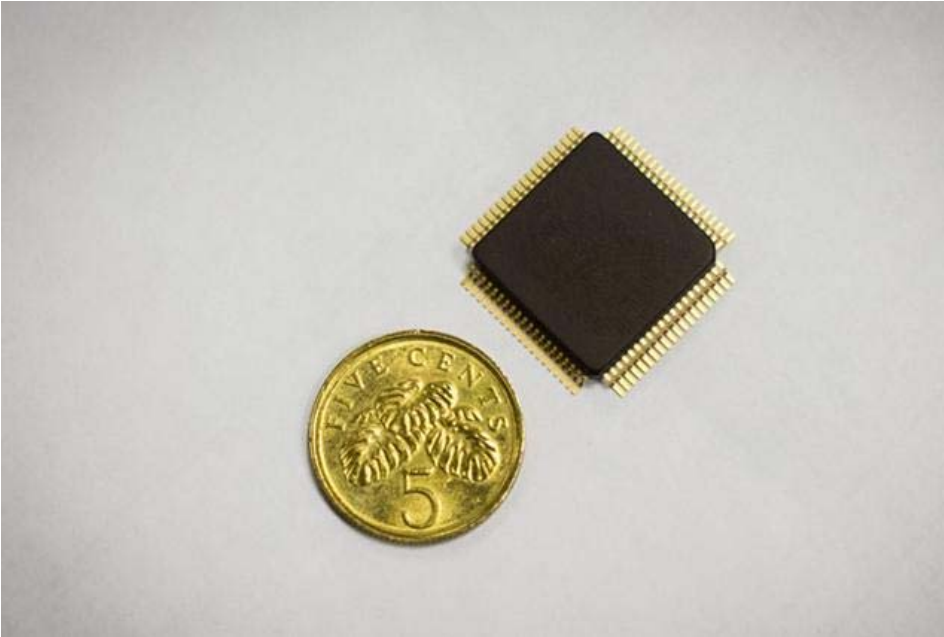
Engineering and Technology Magazine

Wireless brain-implant chip could help with Parkinsons

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An innovative smart chip for implanting in the human brain could be a breakthrough in portable health monitoring devices and wearables.

This chip, only five times five mm in size, could improve usability of neural implants for Parkinson's disease sufferers devices and wearables.

The chip, developed by scientists from Nanyang Technological University, Singapore, has been described as being 100 times more energy efficient than similar chips already available.

Energy efficiency is key for the potential of the chip, which is only 5x5mm in size, as it doesn't require bulky batteries yet is still able to transmit data with an accuracy of up to 95 per cent.

"It will lead to more compact medical wearable devices, such as portable ECG monitoring devices and neural implants, since we no longer need large batteries to power them," said Assistant Professor Arindam Basu from NTU's School of Electrical and Electronic Engineering.

The chip, for example, could be implanted in the brain of a Parkinson's disease sufferer and communicate with neural implants, designed to alleviate the patient's symptoms. Alternatively, it could be used to enable amputees to move their artificial limbs.

Currently, such implants need to be connected to an external computer that decodes the brain signal. Such a solution is not only cumbersome and impractical but also potentially dangerous as it requires permanent holes in the skull through which the wires lead to the implants. These holes could easily get infected, threatening the patient's life.

Previous experiments with wireless transmission from neural implants achieved only mixed results. For the brain signal to be useful, a large amount of data needs to be transmitted, which requires a lot of power. Enough power for a wireless transmitter would require bulky batteries for which there is no space in the brain.

The Singaporean researchers solved this problem by carefully reducing the amount of data transmitted.

Although the chip can analyse thousands of signals from the neural implants, it focuses on abnormalities and only sends out the most relevant data after compressing it.

The researchers said they had tested the chip on animal model data and were able to successfully decode up to 95 per cent of the signals.

The chip could also be used in various Internet of Things devices, such as remote video cameras for detection of intruders.

Similar to the brain implant application, the chip would again only transmit the relevant information in a compressed package instead of the whole data stream.

According to marketing research firm Gartner, there will be 20.8 billion smart devices and appliances connected to the Internet by 2020, which means that reducing network traffic will be a priority for most companies.

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